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## **\$45 MILLION HEADED FOR STEM CELL RESEARCH IN CALIFORNIA**

### **Governor Schwarzenegger Marks Historic Date**

#### **Grants Honor Noted Alzheimer's Researcher Leon Thal**

SAN FRANCISCO, February 16, 2007 – More than two years after voters approved a \$3 billion program to fund stem cell research in California, the state has approved the first grants focused solely on human embryonic stem cell research.

The 29-member Independent Citizens Oversight Committee (ICOC), governing board of the California Institute for Regenerative Medicine (CIRM), today approved 72 grants totaling approximately \$45 million over two years, to researchers at 20 academic and non-profit research centers throughout the state. The grants were selected from among 231 applications totaling more than \$138.3 million from 36 California institutions.

"Today is a day for great hope. These initial grants are important because we all know that we cannot afford to wait when it comes to advancing potentially life-saving science," said Governor Arnold Schwarzenegger. "This research brings hope for an eventual end to the suffering from chronic disease - such as Alzheimer's disease, cancer or multiple sclerosis - and promise for the people who love someone with one of these terrible illnesses."

ICOC Chairman Robert N. Klein said, "Today marks another milestone in one of the most important public endeavors ever undertaken by California. Patients and families around the globe will take heart that human embryonic stem cell research is finally beginning to receive the funding it needs and deserves. We are grateful for the Governor's leadership on this critical project, for the support of private philanthropists, and for the votes of seven million Californians who made this day possible by voting for Proposition 71."

Scientific Excellence through Exploration and Development (SEED) Grants were intended to bring new ideas and new investigators into the field of human embryonic stem cell (hESC) research, and offer an opportunity for investigators to carry out studies that may yield preliminary data or proof-of-principle results that could then be extended to full scale investigations.

"Our intent was to bring new ideas and new talent to human embryonic stem cell research – and these grants do exactly that," said Zach W. Hall, Ph.D., CIRM's President and Chief Scientific Officer. "They are going to 30 scientists who are new to the field of stem cell research and 27 who have been independent investigators for six years or less. The quality of the science that is being proposed is very high, which bodes well for the future of stem cell research in California."

The ICOC voted to name these grants in honor of Leon J. Thal, M.D. Dr. Thal was a professor and chair of the Department of Neurosciences at the University of California, San Diego. He was one of the world's leading experts on Alzheimer's disease and a Governor's appointee to the ICOC. He died earlier this month when the plane he was piloting crashed.

The ICOC originally planned to approve up to 30 grants totaling \$24 million in August, 2006, following Governor Schwarzenegger's authorization of a \$150 million loan to CIRM from the state's general fund. It is slated to approve up to another 25 for \$80 million in March, for research conducted by established stem cell scientists.

"We were amazed by the large number of applications that we received. Because of their high quality it was important to increase the number of awards and the amount of money granted," said Klein. "These projects will truly jump start stem cell research in California."

The grants will fund a broad range of projects, including:

- An attempt to direct hESCs to generate specific types of forebrain neurons and see if they can functionally integrate into cortical circuits (UC San Diego)
- An examination of the role of mitochondria in hESC differentiation (UCLA)
- A study of the role of a specific gene family in “guarding the genome” of hESCs, drawing upon previous research with HIV and other retroviruses (Gladstone Institutes)
- An attempt to identify small molecules that target a specific signaling pathway to support self-renewal or direct differentiation of hESCs, using a chemical genetic approach (UC Riverside)
- Generation of a library of hESC lines that model a number of human genetic diseases (Burnham Institute)
- Development of cutting-edge imaging techniques to view how heart cells derived from hESCs repair and restore myocardial function (Stanford)
- A study of how mutations in mitochondria affect the stability of hESCs and their ability to grow and develop into nerve cells (UC Irvine)

The ICOC approved Leon J. Thal SEED Grants to the following researchers (**Note: the dollar amounts shown are the two-year budgets requested by each applicant and are subject to review and revision by CIRM, prior to the issuance of grant awards**):

Application#	Principal Investigator	Institution	Title	Amount
<a href="#">RS1-00161-1</a>	Blelloch, Dr. Robert Hector	University of California, San Francisco	MicroRNA Regulation of Human Embryonic Stem Cell Self-Renewal and Differentiation	\$631,831
<a href="#">RS1-00163-1</a>	Bredesen, Dr. Dale Eric	Buck Institute for Age Research	Programmed Cell Death Pathways Activated in Embryonic Stem Cells	\$734,202
<a href="#">RS1-00169-1</a>	Cashman, Dr. John R.	Human BioMolecular Research Institute	Discovering Potent Molecules with Human ESCs to Treat Heart Disease	\$714,654
<a href="#">RS1-00170-1</a>	Chen, Dr. Bin	University of California, Santa Cruz	In vitro differentiation of hESCs into corticospinal motor neurons	\$500,000
<a href="#">RS1-00171-1</a>	Chen, Dr. Huei-Sheng Vincent	Burnham Institute for Medical Research	Development of Neuro-Coupled Human Embryonic Stem Cell-Derived Cardiac Pacemaker Cells.	\$744,639
<a href="#">RS1-00172-1</a>	Chen, Dr. Irvin S.Y.	University of California, Los Angeles	Genetic modification of the human genome to resist HIV-1 infection and/or disease progression	\$642,652
<a href="#">RS1-00173-1</a>	Chien, Professor Shu	University of California, San Diego	Combinatorial Platform for Optimizing Microenvironments to Control hESC Fate	\$638,140
<a href="#">RS1-00174-1</a>	Choe, Dr. Senyon	The Salk Institute for Biological Studies	A method to maintain and propagate pluripotent human ES cells	\$796,348
<a href="#">RS1-00183-1</a>	Cooke, Dr. John P	Stanford University	EC regeneration in cerebrovascular ischemia: role of NO	\$658,125
<a href="#">RS1-00193-1</a>	Duester, Dr. Gregg	Burnham Institute for Medical Research	Retinoic Acid-FGF Antagonism during Motor Neuron Differentiation of Human ES Cells	\$759,000

Application#	Principal Investigator	Institution	Title	Amount
<a href="#">RS1-00195-1</a>	Emerson, Dr. Beverly M.	The Salk Institute for Biological Studies	Regulation of Specific Chromosomal Boundary Elements by CTCF Protein Complexes in Human Embryonic Stem Cells	\$678,788
<a href="#">RS1-00198-1</a>	Evans, Professor Sylvia M.	University of California, San Diego	Specification of Ventricular Myocyte and Pacemaker Lineages Utilizing Human Embryonic Stem Cells	\$609,999
<a href="#">RS1-00199-1</a>	Feldheim, Dr. David	University of California, Santa Cruz	Assessing the role of Eph/ephrin signaling in hESC growth and differentiation	\$499,999
<a href="#">RS1-00200-1</a>	Freeze, Dr. Hudson H.	Burnham Institute for Medical Research	Role of Glycans in Human Embryonic Stem Cell Conversion to Neural Precursor Cells	\$759,000
<a href="#">RS1-00203-1</a>	Galic, Dr. Zoran	University of California, Los Angeles	Genetic Enhancement of the Immune Response to Melanoma via hESC-derived T cells	\$642,501
<a href="#">RS1-00205-1</a>	Ghosh, Dr. Anirvan	University of California, San Diego	Generation of forebrain neurons from human embryonic stem cells	\$612,075
<a href="#">RS1-00207-1</a>	Giudice, Dr. Linda C.	University of California, San Francisco	Human Embryonic Stem Cell Differentiation to Trophoblast: Basic Biology and Clinical Translation to Improve Human Fertility	\$640,399
<a href="#">RS1-00210-1</a>	Greene, Dr. Warner C.	The J. David Gladstone Institutes	The APOBEC3 Gene Family as Guardians of Genome Stability in Human Embryonic Stem Cells	\$777,467
<a href="#">RS1-00215-1</a>	Guo, Dr. Su	University of California, San Francisco	Identifying small molecules that stimulate the differentiation of hESCs into dopamine-producing neurons	\$564,309
<a href="#">RS1-00222-1</a>	Hinton, Dr. David R	University of Southern California	Therapeutic potential of Retinal Pigment Epithelial cell lines derived from hES cells for retinal degeneration.	\$684,322
<a href="#">RS1-00225-1</a>	Huang, Dr. Ziwei	Burnham Institute for Medical Research	New Chemokine-Derived Therapeutics Targeting Stem Cell Migration	\$759,000
<a href="#">RS1-00228-1</a>	Jamieson, Dr. Catriona	University of California, San Diego	Derivation and Characterization of Cancer Stem Cells from Human ES Cells	\$642,500
<a href="#">RS1-00236-1</a>	Kay, Dr. Mark A	Stanford University	Novel vectors for gene transfer into human ES cells	\$640,642
<a href="#">RS1-00239-1</a>	Khine, Dr. Michelle	University of California, Merced	Micro Platform for Controlled Cardiac Myocyte Differentiation	\$363,707
<a href="#">RS1-00242-1</a>	Kovacs, Professor Gregory T. A.	Stanford University	Technology for hESC-Derived Cardiomyocyte Differentiation and Optimization of Graft-Host Integration in Adult Myocardium	\$634,287
<a href="#">RS1-00243-1</a>	Kuo, Dr. Calvin Jay	Stanford University	Differentiation of Human Embryonic Stem Cells to Intestinal Fates	\$578,943

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<a href="#">RS1-00245-1</a>	Kurdistani, Dr. Siavash K	University of California, Los Angeles	Cellular epigenetic diversity as a blueprint for defining the identity and functional potential of human embryonic stem cells	\$641,047
<a href="#">RS1-00249-1</a>	Lawlor, Dr. Elizabeth R	Children's Hospital of Los Angeles	hESC as tools to investigate the neural crest origin of Ewing's sarcoma	\$675,001
<a href="#">RS1-00259-1</a>	Lowry, Dr. William E	University of California, Los Angeles	Modeling Human Embryonic Development with Human Embryonic Stem Cells	\$571,575
<a href="#">RS1-00262-1</a>	Lu, Dr. Wange	University of Southern California	Regulation of human neural progenitor cell proliferation by Ryk-mediated Wnt signaling	\$668,987
<a href="#">RS1-00271-1</a>	McConnell, Professor Susan K	Stanford University	Optimization of guidance response in human embryonic stem cell derived midbrain dopaminergic neurons in development and disease	\$633,170
<a href="#">RS1-00280-1</a>	Murre, Professor Cornelis	University of California, San Diego	Generation of long-term cultures of human hematopoietic multipotent progenitors from embryonic stem cells	\$538,211
<a href="#">RS1-00283-1</a>	Oshima, Dr. Robert G.	Burnham Institute for Medical Research	Trophoblast differentiation of human ES cells.	\$748,240
<a href="#">RS1-00288-1</a>	Pfaff, Dr. Samuel L.	The Salk Institute for Biological Studies	Gene regulatory mechanisms that control spinal neuron differentiation from hES cells.	\$807,749
<a href="#">RS1-00289-1</a>	Pirrung, Professor Michael C	University of California, Riverside	Stem Cell Survival and Differentiation Through Chemical Genetics	\$543,987
<a href="#">RS1-00292-1</a>	Ren, Bing	Ludwig Institute for Cancer Research	Mapping the transcriptional regulatory elements in the genome of hESC	\$691,489
<a href="#">RS1-00295-1</a>	Robey, Professor Ellen A	University of California, Berkeley	In Vitro Differentiation of T cells from Human Embryonic Stem Cells.	\$499,999
<a href="#">RS1-00298-1</a>	Sage, Julien	Stanford University	Functions of RB family proteins in human embryonic stem cells	\$520,777
<a href="#">RS1-00302-1</a>	Schultz, Professor Peter G	Scripps Research Institute	A Chemical Approach to Stem Cell Biology	\$784,900
<a href="#">RS1-00305-1</a>	Smotrich, Dr. David	Burnham Institute for Medical Research	Generation of hESC lines, under defined conditions, modeling normal & diseased states from material stored at the Burnham shared embryo bank.	\$638,000
<a href="#">RS1-00313-1</a>	Teitell, Dr. Michael Alan	University of California, Los Angeles	Role of Mitochondria in Self-Renewal Versus Differentiation of Human Embryonic Stem Cells	\$635,024
<a href="#">RS1-00317-1</a>	Verdin, Dr. Eric M.	The J. David Gladstone Institutes	Role of HDAC in human stem cells pluripotentiality and differentiation	\$790,999

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<a href="#">RS1-00319-1</a>	Wandless, Professor Thomas J.	Stanford University	Reprogramming Differentiated Human Cells to a Pluripotent State	\$647,681
<a href="#">RS1-00321-1</a>	Weinberg, Dr. Kenneth I	Stanford University	Embryonic stem cell-derived thymic epithelial cells	\$658,057
<a href="#">RS1-00322-1</a>	Wu, Joseph C	Stanford University	In Vivo Imaging of Human Embryonic Stem Cell Derivatives and Tumorigenicity	\$658,123
<a href="#">RS1-00323-1</a>	Wysocka, Professor Joanna	Stanford University	Role of Chromatin Modifiers in Regulating Human Embryonic Stem Cell Pluripotency	\$658,126
<a href="#">RS1-00326-1</a>	Yang, Dr. Phillip Chung-Ming	Stanford University	In Vivo Molecular Magnetic Resonance Imaging of Human Embryonic Stem Cells in Murine Model of Myocardial Infarction	\$658,125
<a href="#">RS1-00327-1</a>	Ying, Dr. Qilong	University of Southern California	Self-renewal of human embryonic stem cells	\$663,209
<a href="#">RS1-00331-1</a>	Zhang, Dr. Zhuohua	Burnham Institute for Medical Research	Modeling Parkinson's Disease Using Human Embryonic Stem Cells	\$758,999
<a href="#">RS1-00333-1</a>	Zheng, Dr. Binhai	University of California, San Diego	Genetic manipulation of human embryonic stem cells and its application in studying CNS development and repair	\$642,361
<a href="#">RS1-00365-1</a>	Bertozzi, Professor Carolyn Ruth	University of California, Berkeley	Profiling surface glycans and glycoprotein expression of human embryonic stem cells	\$498,409
<a href="#">RS1-00377-1</a>	Cummings, Dr. Brian John	University of California, Irvine	The Immunological Niche: Effect of immunosuppressant drugs on stem cell proliferation, gene expression, and differentiation in a model of spinal cord injury.	\$619,223
<a href="#">RS1-00381-1</a>	Daldrup-Link, Dr. Heike E.	University of California, San Francisco	Labeling of human embryonic stem cells with iron oxide nanoparticles and fluorescent dyes for a non-invasive cell depiction with MR imaging and optical imaging	\$251,088
<a href="#">RS1-00402-1</a>	Kasahara, Dr. Noriyuki	University of California, Los Angeles	Down-Regulation of Alloreactive Immune Responses to hES Cell-Derived Graft Tissues	\$469,219
<a href="#">RS1-00404-1</a>	Kim, Dr. Seung K.	Stanford University	Patient-specific cells with nuclear transfer	\$656,074
<a href="#">RS1-00408-1</a>	Laird, Professor Peter William	University of Southern California	Screening for Oncogenic Epigenetic Alterations in Human ES Cells	\$685,000
<a href="#">RS1-00409-1</a>	Lane, Dr. Thomas Edward	University of California, Irvine	Human Embryonic Stem Cells and Remyelination in a Viral Model of Demyelination	\$425,594

Application#	Principal Investigator	Institution	Title	Amount
<a href="#">RS1-00413-1</a>	Limoli, Professor Charles L.	University of California, Irvine	Using human embryonic stem cells to treat radiation-induced stem cell loss: Benefits vs cancer risk	\$625,617
<a href="#">RS1-00416-1</a>	MacGregor, Dr. Grant R	University of California, Irvine	Production of Oocytes from Human ES Cells	\$623,781
<a href="#">RS1-00420-1</a>	Mikkola, Dr. Hanna	University of California, Los Angeles	Improving microenvironments to promote hematopoietic stem cell development from human embryonic stem cells	\$577,037
<a href="#">RS1-00428-1</a>	O'Connor, Dr. Timothy R.	City of Hope National Medical Center	Sources of Genetic Instability in Human Embryonic Stem Cells.	\$357,978
<a href="#">RS1-00432-1</a>	Procaccio, Dr. Vincent	University of California, Irvine	Mitochondrial Dysfunction in Embryonic Stem Cells	\$632,500
<a href="#">RS1-00434-1</a>	Ramalho-Santos, Miguel	University of California, San Francisco	Transcriptional Regulation of Human Embryonic Stem Cells	\$618,901
<a href="#">RS1-00444-1</a>	Tlsty, Dr. Thea D.	University of California, San Francisco	Role of the tumor suppressor gene, p16INK4a, in regulating stem cell phenotypes in embryonic stem cells and human epithelial cells.	\$639,150
<a href="#">RS1-00449-1</a>	Weaver, Dr. Valerie Marie	University of California, San Francisco	Force, Dimensionality and Stem Cell Fate	\$561,082
<a href="#">RS1-00452-1</a>	Willenbring, Dr. Holger	University of California, San Francisco	Induction of pluripotency in fibroblasts by fusion with enucleated human embryonic stem cell syncytia	\$342,962
<a href="#">RS1-00453-1</a>	Yamoah, Ebenezer N.	University of California, Davis	Hair Cells and Spiral Ganglion Neuron Differentiation from Human Embryonic Stem Cells	\$469,327
<a href="#">RS1-00455-1</a>	Yokomori, Kyoko	University of California, Irvine	Derivation and characterization of human ES cells from FSHD embryos	\$632,500
<a href="#">RS1-00462-1</a>	Gao, Dr. Fen-Biao	The J. David Gladstone Institutes	MicroRNAs in Human Stem Cell Differentiation and Mental Disorders	\$791,000
<a href="#">RS1-00464-1</a>	Reddi, Professor Hari A	University of California, Davis	hESCs for Articular Cartilage Regeneration	\$367,650
<a href="#">RS1-00466-1</a>	Terskikh, Dr. Alexey	Burnham Institute for Medical Research	Analysis of Candidate Neural Crest Cells Derived from Human ES Cells	\$759,000
<a href="#">RS1-00477-1</a>	Sauer, Dr. Frank Uwe	University of California, Riverside	Non-coding RNA as tool for the active control of stem cell differentiation	\$595,469

**Total                   \$44,839,926**

#### About CIRM

Governed by the ICOC, CIRM was established in 2004 with the passage of Proposition 71, the California Stem Cell Research and Cures Initiative. The statewide ballot measure, which provided

\$3 billion in funding for stem cell research at California universities and research institutions, was approved by California voters, and called for the establishment of an entity to make grants and provide loans for stem cell research, research facilities, and other vital research opportunities. For more information, please visit [www.cirm.ca.gov](http://www.cirm.ca.gov).

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